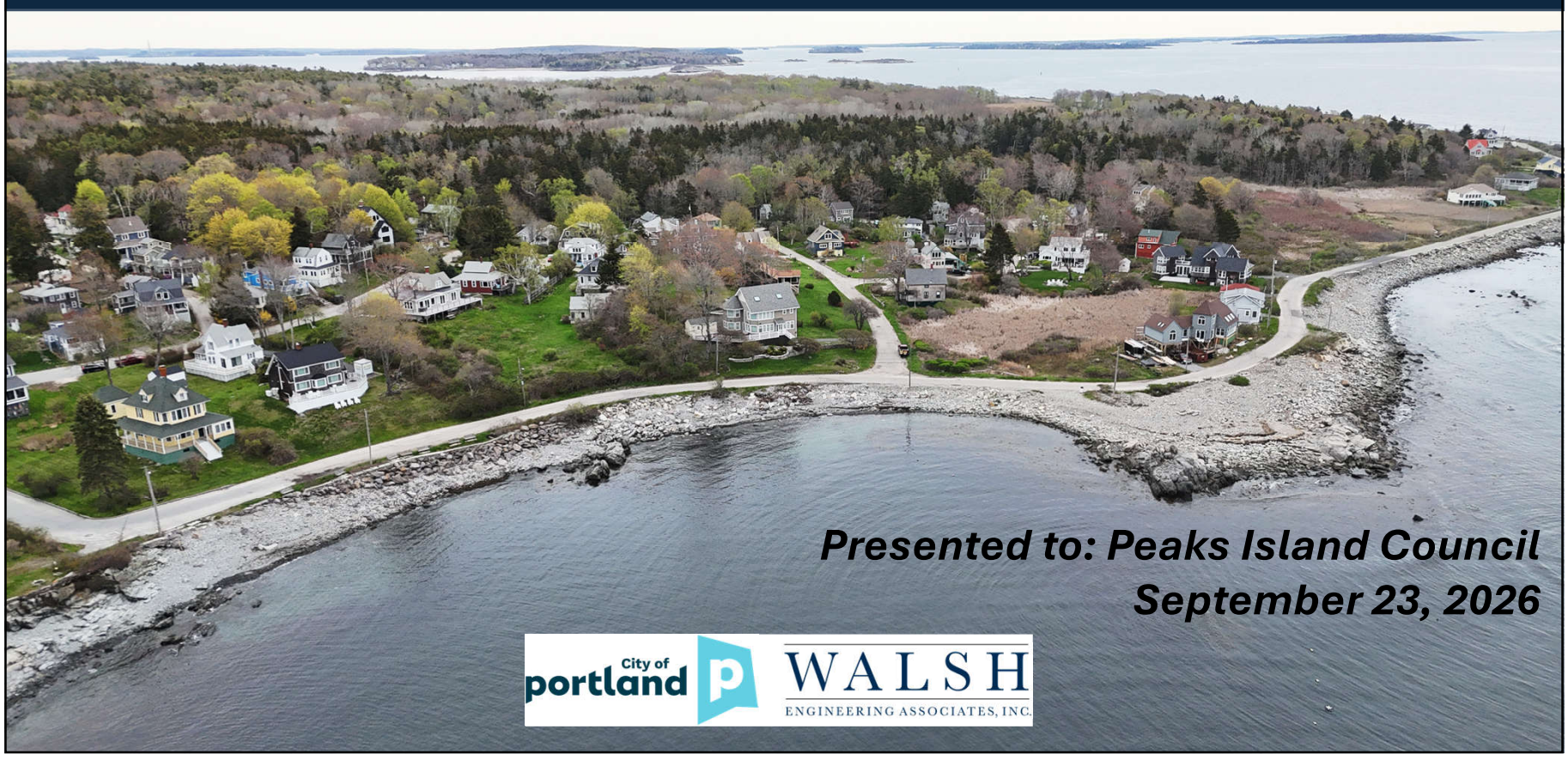
Peaks Island Shoreline Stabilization Project



1

Presentation Overview

- Project Team
- Project Need
- FEMA/MEMA Assessment and Funding Process
- Project Goals
- Design Considerations & Development
- Proposed Improvements
- Questions/Discussion

2

Project Team

- City of Portland
  - Keith Gray, P.E. – City Engineer
  - Kris DeVolder – Project Manager

- Walsh Engineering Associates, Inc. (WEA)
  - Bill Walsh, P.E. – President, Principal Engineer
  - Leyna Tobey, P.E. – Project Manager
  - Company Information:
    - Licensed Professional Engineers
    - Located in Portland
    - Completed over 80 shoreline projects on the Maine coast

City of Portland, Maine
Department of Public Works
Request for Proposals
Engineering and Permitting Services
Portland Shoreline Erosion

3

Project Need



4



5



6



FEMA/MEMA Storm Damage Assessment

City of portland

WALSH ENGINEERING ASSOCIATES, INC.

Natural Hazard Event Occurs

↓

Local officials collect damage assessments and submit to MEMA

↓

MEMA submits damage assessments to Governor for Disaster Declaration if State PA thresholds were met

↓

Governor submits Disaster Declaration to the President through FEMA

↓

President approves Disaster Declaration

Maine Severe Storms and Flooding (DR-4764-ME)

Incident Period: January 9, 2024 - January 13, 2024

Major Disaster Declaration declared on March 20, 2024

FEDERAL EMERGENCY MANAGEMENT AGENCY

EMERGENCY MANAGEMENT AGENCY STATE OF MAINE

Damage Description:	Photo# 07

Washed out rock seawall due to storm surge and surface flooding. Seashore Ave. Site #2



Seashore Avenue Site #2 (43.65262, -70.19010) (43.66627, -70.18325):

- Surface, 597.1139 CY of Asphalt surface, 2,149.61 FT long x 18 FT wide x 5 IN deep, Storm surge and surface flooding caused the asphalt road to be washed onto the shoulder and onto the beach., 0% work completed.
- Seawall, 75.5556 CY of Mixed medium rip rap with poured concrete, 136 FT long x 3 FT wide x 5 FT deep, Storm surge and surface flooding caused rip rap making up the seawall to be washed onto the beach and into the ocean., 0% work completed.
- Seawall, 1,248.3111 CY of 3' X 2' X 2' Angular rock, 280.87 FT long x 30 FT wide x 4 FT high, Storm surge and surface flooding caused angular rock (rip rap) making up the seawall to be washed onto the beach and into the ocean., 0% work completed.
- Seawall, 527.7778 CY of 4' X 4' X 4' Angular rock, 190 FT long x 15 FT wide x 5 FT deep, Storm surge and surface flooding caused angular rock (rip rap) making up the seawall to be washed onto the beach and into the ocean., 0% work completed.

“Damage Description and Dimensions”

FEMA/MEMA Project Funding

REPAIR

Rebuild the infrastructure you had, as it was pre-storm

E. Remove and Replace, 597.1139 CY of Asphalt surface, 2,149.61 FT long x 18 FT wide x 5 IN deep.

F. Remove and Replace, 75.5556 CY of Mixed medium rip rap with poured concrete, 136 FT long x 3 FT wide x 5 FT deep.

G. Remove and Replace, 1,248.3111 CY of 3' X 2' X 2' Angular rock, 280.87 FT long x 30 FT wide x 4 FT high.

H. Remove and Replace, 527.7778 CY of 4' X 4' X 4' Angular rock, 190 FT long x 15 FT wide x 5 FT deep.

I. Remove and Replace, 562.963 CY of 2' X 2' X 2' Angular rock, 190 FT long x 20 FT wide x 4 FT deep.

J. Remove and Replace, 288.8889 CY of 2' X 2' X 2' medium size angular rock, 130 FT long x 15 FT wide x 4 FT deep.

K. Remove and Replace, 1,213.7778 CY of 4' X 4' X 3' angular rock, 273.1 FT long x 20 FT wide x 6 FT deep.

L. Remove and Replace, 1,478.4722 CY of 4' X 4' X 3' angular rock, 319.35 FT long x 25 FT wide x 5 FT deep.

M. Remove, 106.1536 CY of Sediment removal, 2,149.61 FT long x 2 FT wide x 8 IN deep.

REPAIR FUNDING GRANTED: $5,235,295

MITIGATION

Improve upon the infrastructure you had to withstand future storm events

Seashore Avenue Site #2 (43.65262, -70.19010) (43.66627, -70.18325):

Mixed medium rip rap with poured concrete seawall (136 FT L x 3 FT W x 5 FT D; 75.5556 CY)

- Adding 22.67 SY of riprap and rock lining, random, broken stone, 3/8 to 1/4 C.Y. pieces, machine placed for slope protection, grouted. RS Means Code # 313713100110, priced at $ 380.27 per SY.

Mitigation Measure Base Cost: $ 8,618.82

"Mitigation consists of providing additional riprap to reinforce the repairs and protect the road and seawalls against future storm surge and surface flooding by dissipating the energy of the incoming water."

MITIGATION FUNDING GRANTED: $774,163

TOTAL FUNDING GRANTED FOR REPAIR/MITIGATION: $6,009,458

9

Project Goals

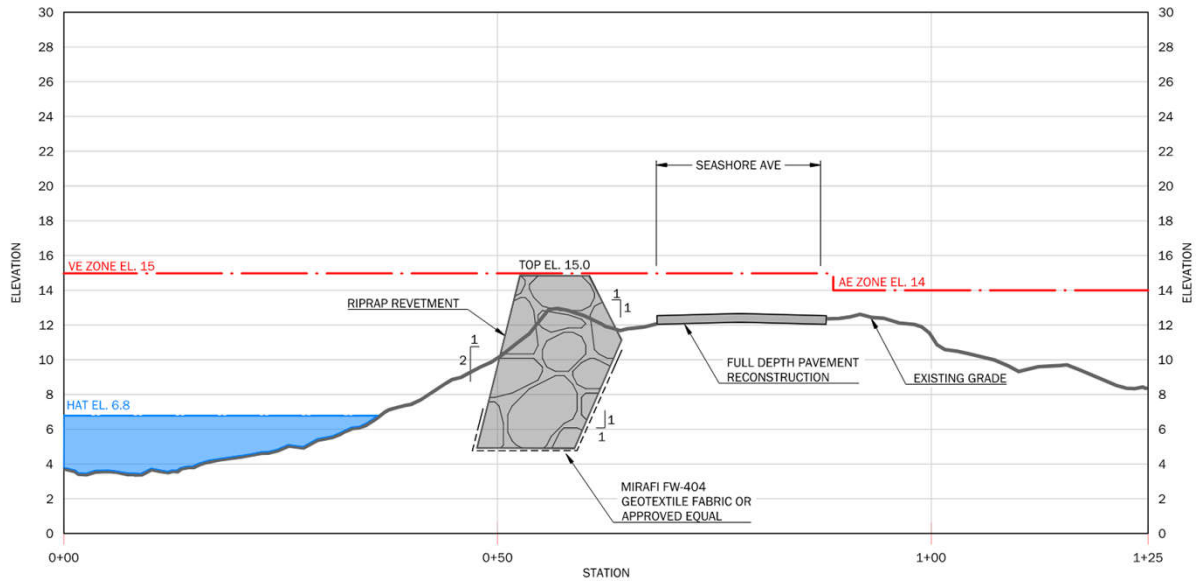
1. PROTECT	2. REPAIR	3. MITIGATE
Protect existing public infrastructure	Stabilize eroding shoreline and repair damaged roadways	Improve upon existing conditions as FEMA/MEMA project scope and budget allows

10

Highest Astronomical Tide (HAT)

DEFINITION: The highest tide that is expected to occur under normal tidal conditions

- **Represents the limits of coastal wetland, which is a permitting boundary**
- **Does not include storm effects or sea level rise**
- **Design is constrained between HAT and roadway**

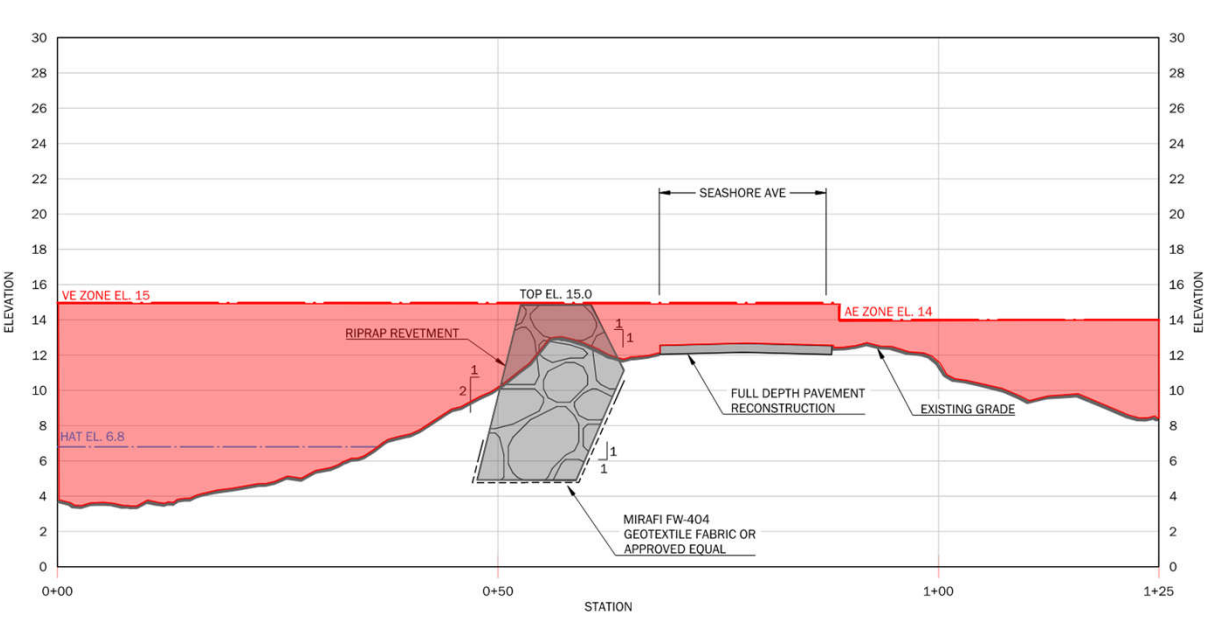


11

FEMA Flood Zones

DEFINITION: The estimated water level during a significant coastal flood event

- **Based on FEMA flood hazard mapping**
- **Represents a flood that has a 1% chance of occurring in any given year (every 100 years)**
- **Includes the combined effects of tides, storm surge, and waves**



12

Flood Zones vs. Roadway Elevations

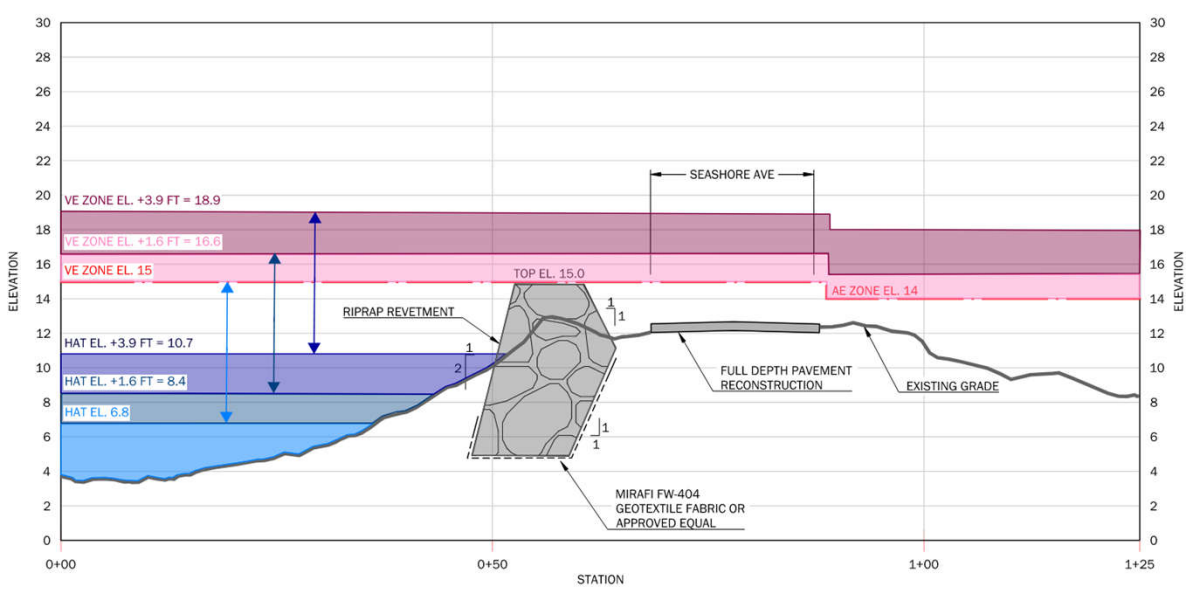
Roadway	Flood Zone VE Elevation (FT)	Roadway High Point Elevation (FT)	Roadway Low Point Elevation (FT)	Elevation Difference Between Flood Zone and Roadway Low Point (FT)
Long Point Road (Walking Path)	16.00	14.00	6.50	9.50
Long Point Road / Seashore Avenue	19.00	17.00	10.75	8.25
Seashore Avenue	16.00	15.35	9.20	6.80
Seashore Avenue	18.00	20.00	12.60	5.40
Seashore Avenue	15.00	15.20	12.45	2.55
Seashore Avenue	23.00	23.50	16.95	6.05
Seashore Avenue	25.00	24.35	17.70	7.30
Seashore Avenue	16.00	20.00	12.50	3.50
Seashore Avenue	20.00	20.00	15.50	4.50
Seashore Avenue	15.00	19.00	14.25	0.75

13

Sea Level Rise

DEFINITION: The gradual increase in average ocean water levels over time

- **Caused by warming oceans and melting on-land ice**
- **Raises the elevation of tides, including the HAT**
- **Increases the frequency and extent of coastal flooding**
- **Maine is planning for approximately 1.6 feet of sea level rise by 2050 and 3.9 feet by 2100**



14

Previous Storm Damage

January 2024 storm damage was documented by FEMA at the following locations:

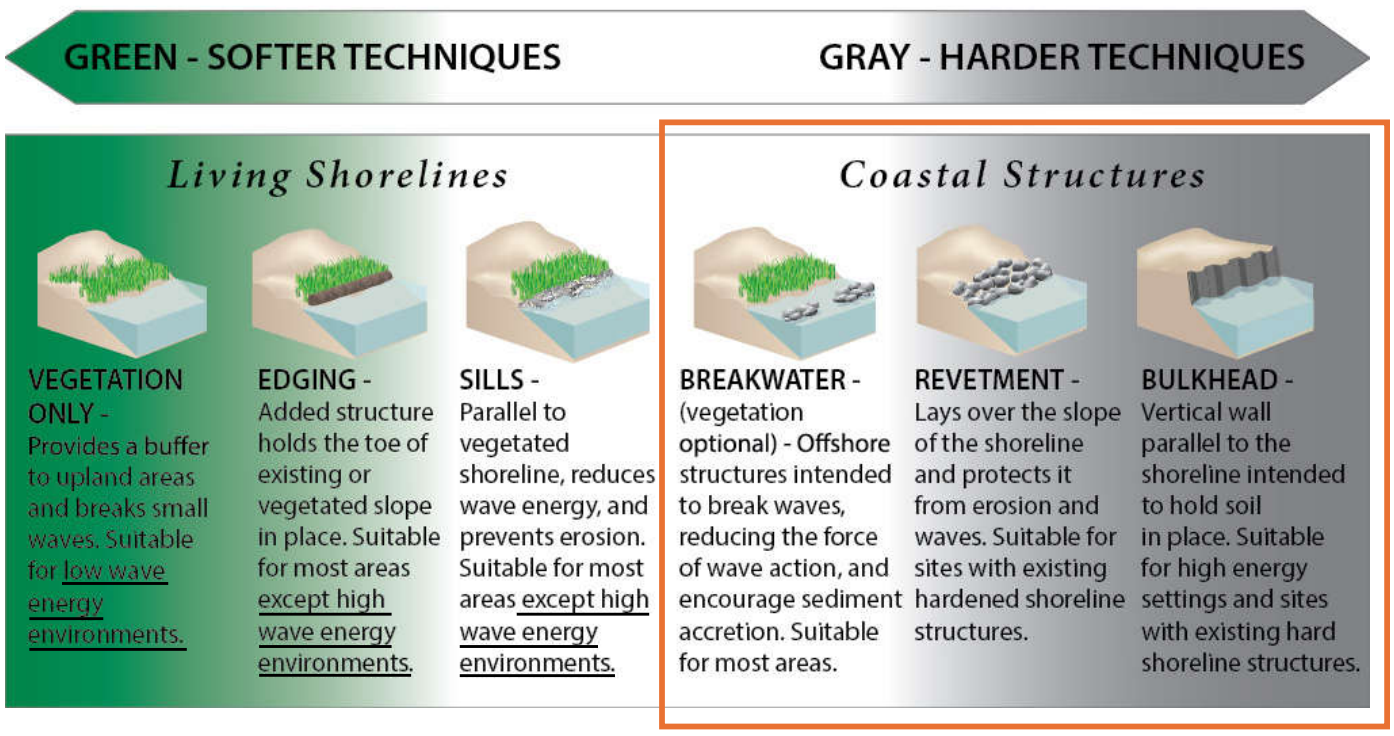
- **The southeasterly portion of Long Point Road (near Picnic Point)**
- **Four main areas along Seashore Avenue**



15

Design Development

What shoreline stabilization techniques are appropriate for this project?



**Graphic from NOAA Fisheries*

16

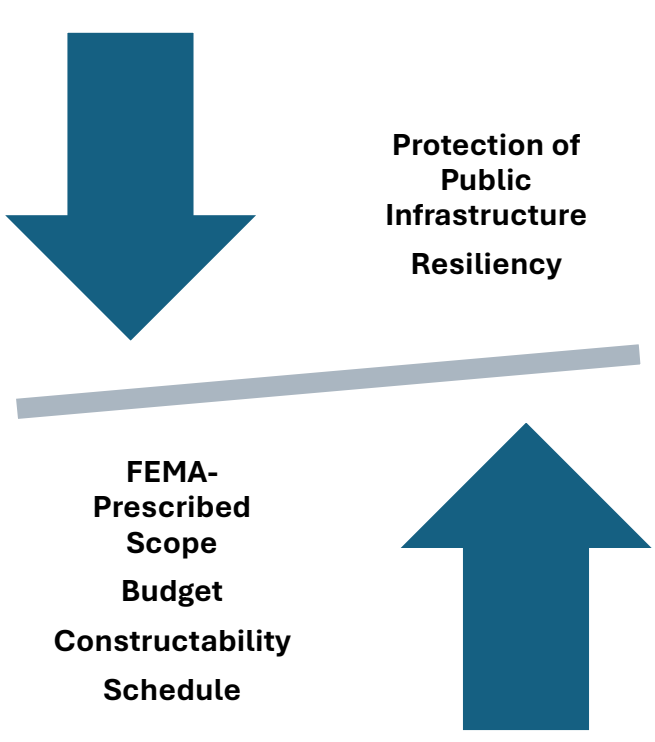
Design Development

1. Develop a Repair Design
2. Evaluate Resilience Improvements
3. Check FEMA Eligibility
4. Estimate Costs
5. Prioritize Improvements
6. Finalize Recommended Design

17

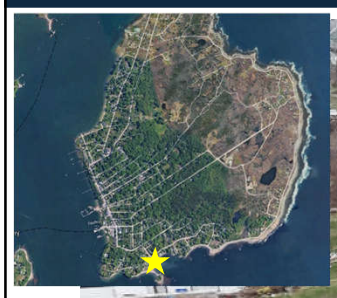
Proposed Improvements

1. Repair Long Point Road back to pre-storm conditions
2. Improve 5 locations along Seashore Avenue (repair and mitigate)



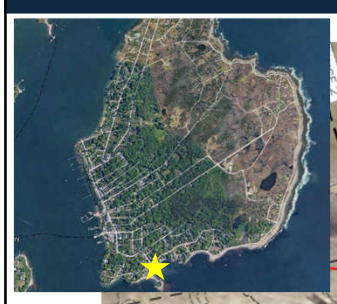
18

Long Point Road – Existing



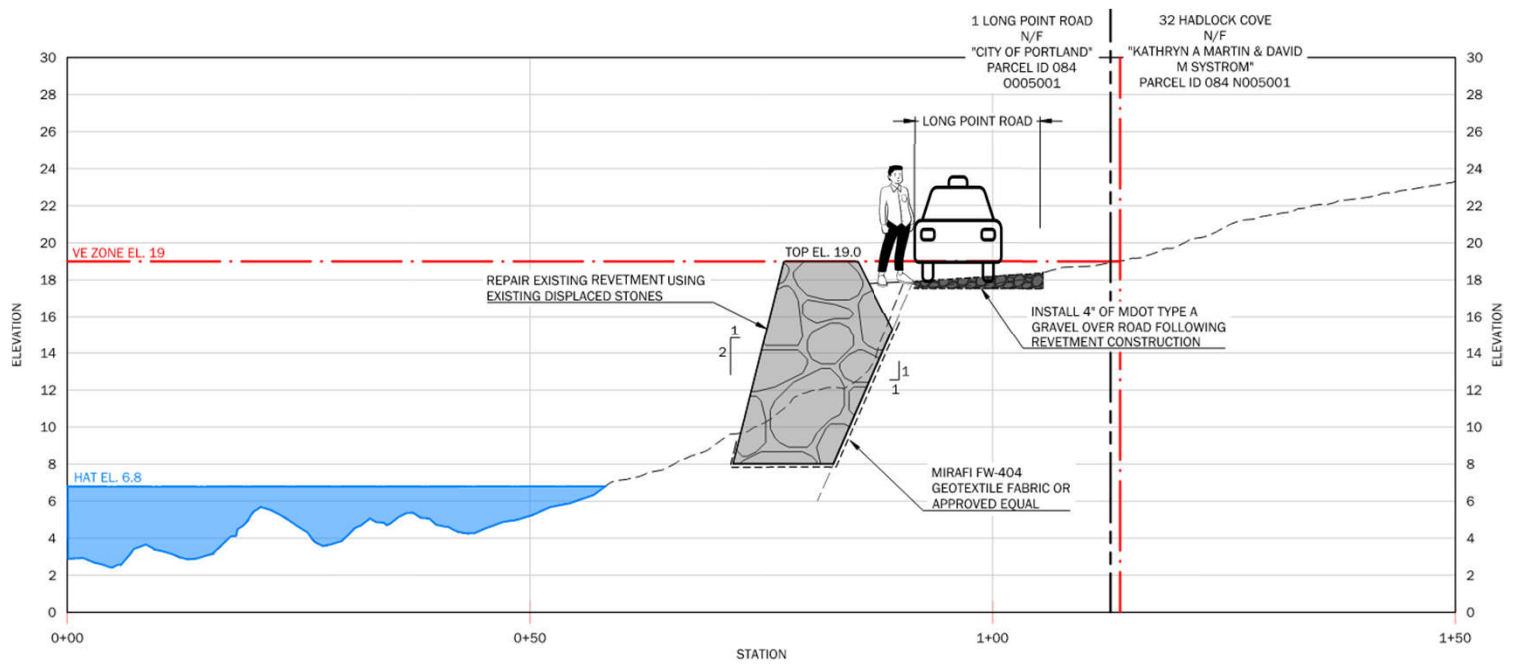
- Erosion/loss of vegetation
- Displaced undersized revetment stones
- Damaged gravel roadway

Long Point Road – Proposed



- Repair riprap revetment using existing stone
- Replant native vegetation lost during storms
- Repair gravel roadway surface

Long Point Road – Proposed

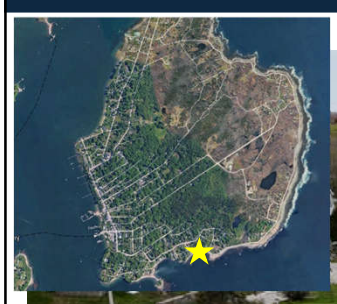


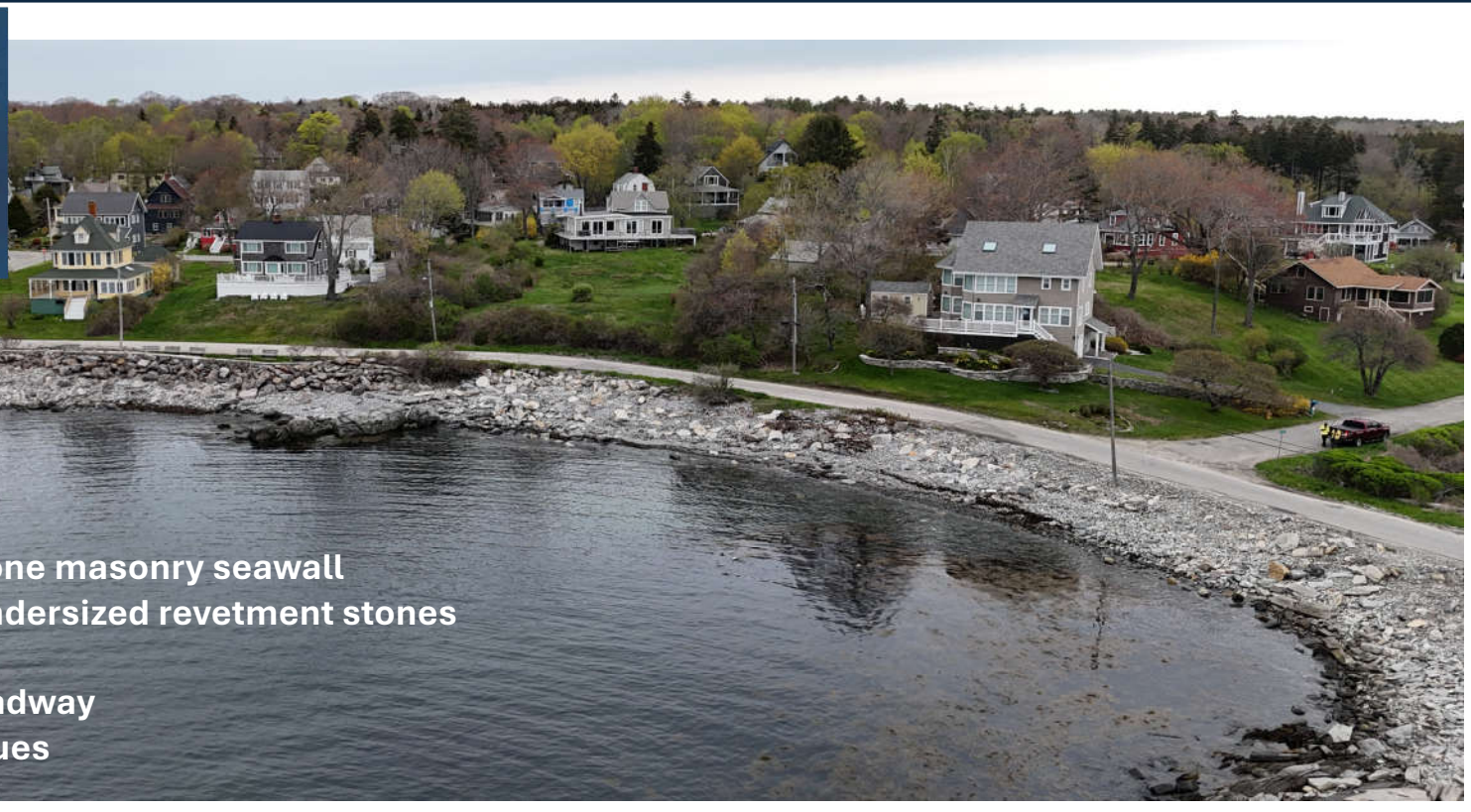
Represents approximately 6-foot tall person

Represents approximately 5-foot tall vehicle

21

Seashore Avenue Area 1 – Existing

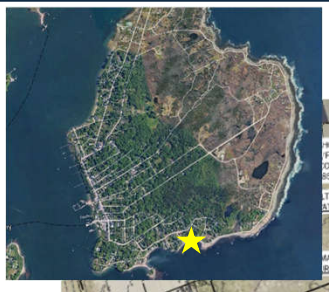




- Damaged stone masonry seawall
- Displaced undersized revetment stones
- Erosion
- Damaged roadway
- Drainage issues

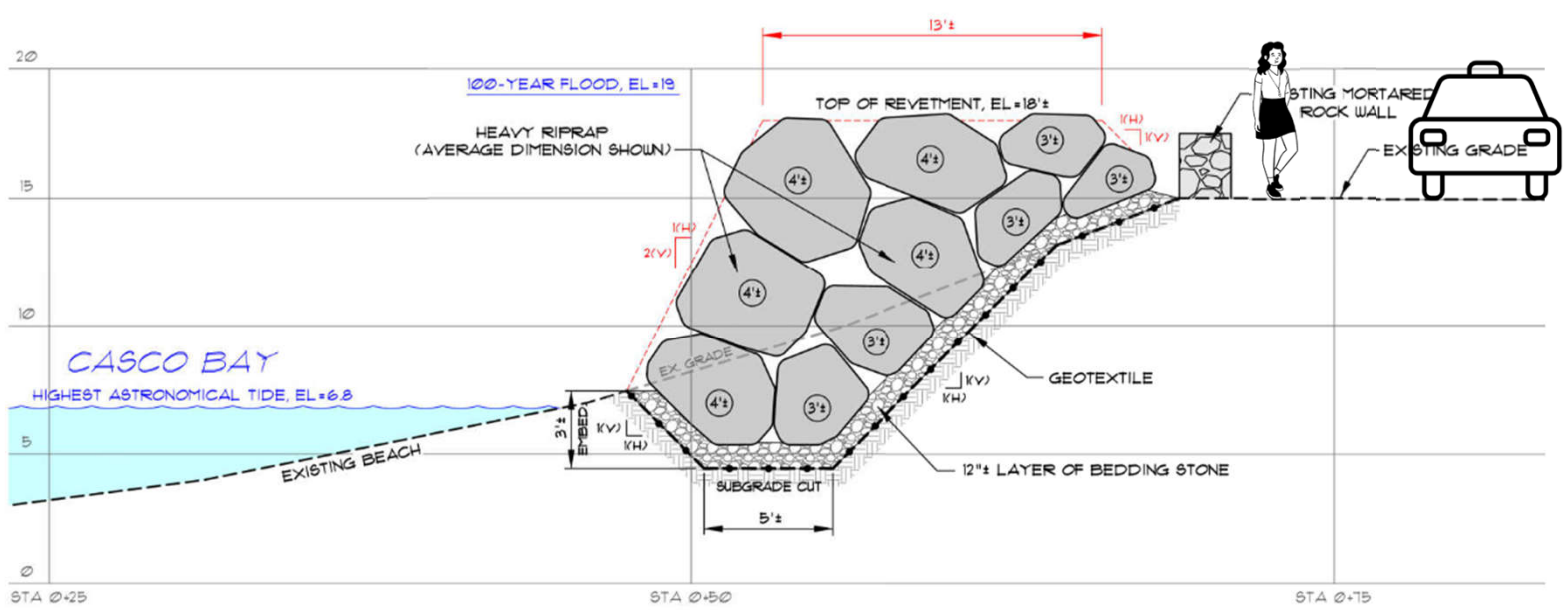
22

Seashore Avenue Area 1 – Proposed



- **Remove damaged seawall**
- **Install adequately sized riprap revetment to 1 foot below base flood elevation**
- **Repair damaged roadway**
- **Improve drainage**

Seashore Avenue Area 1 – Proposed

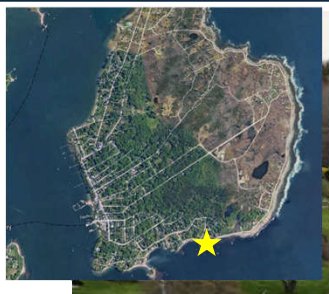


CROSS SECTION 'B'
SCALE : 1" = 4'

Represents approximately 6-foot tall person

Represents approximately 5-foot tall vehicle

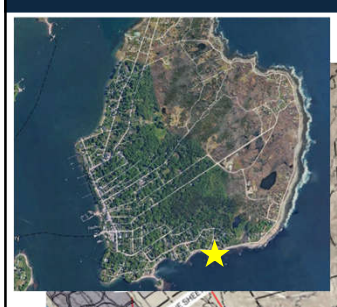
Seashore Avenue Area 2 – Existing

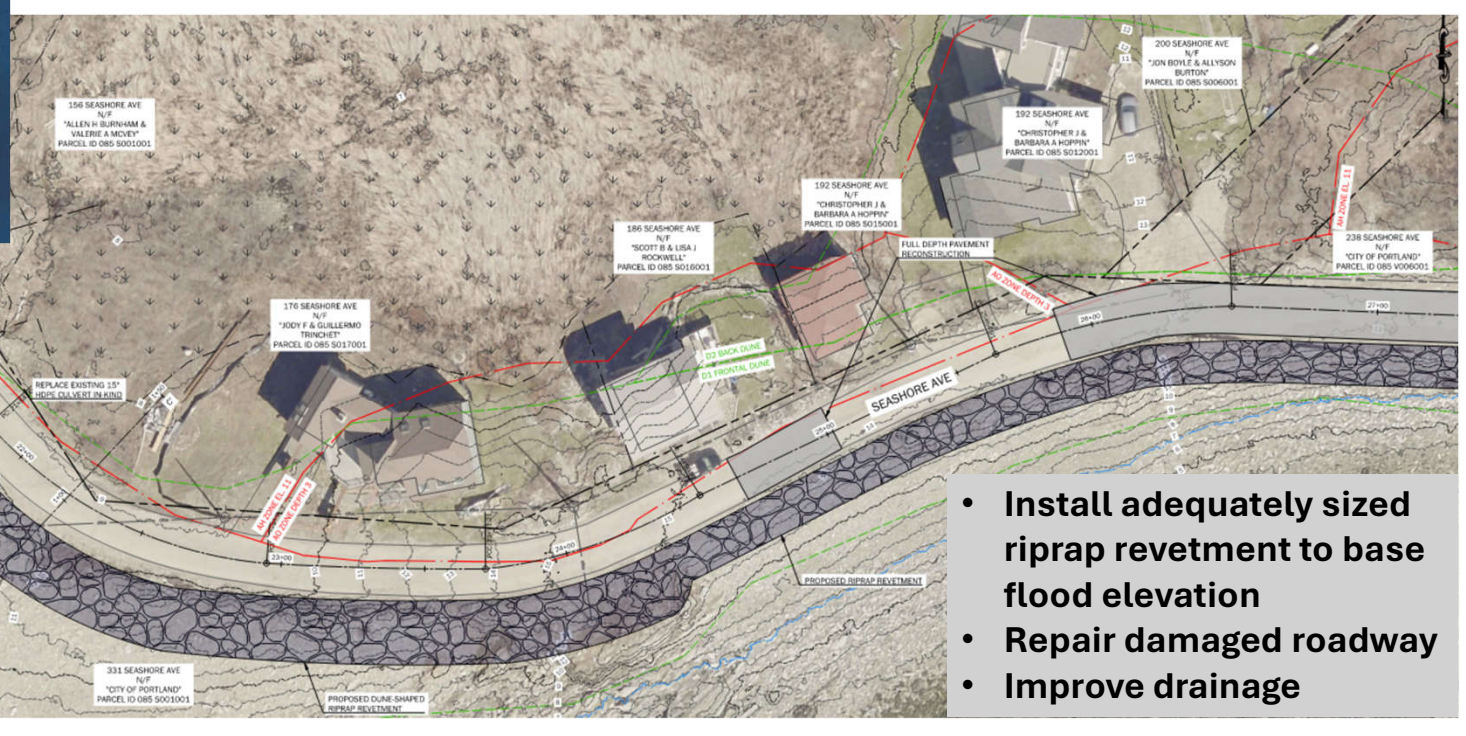


- Erosion
- Displaced stones
- Damaged roadway

25

Seashore Avenue Area 2 – Proposed

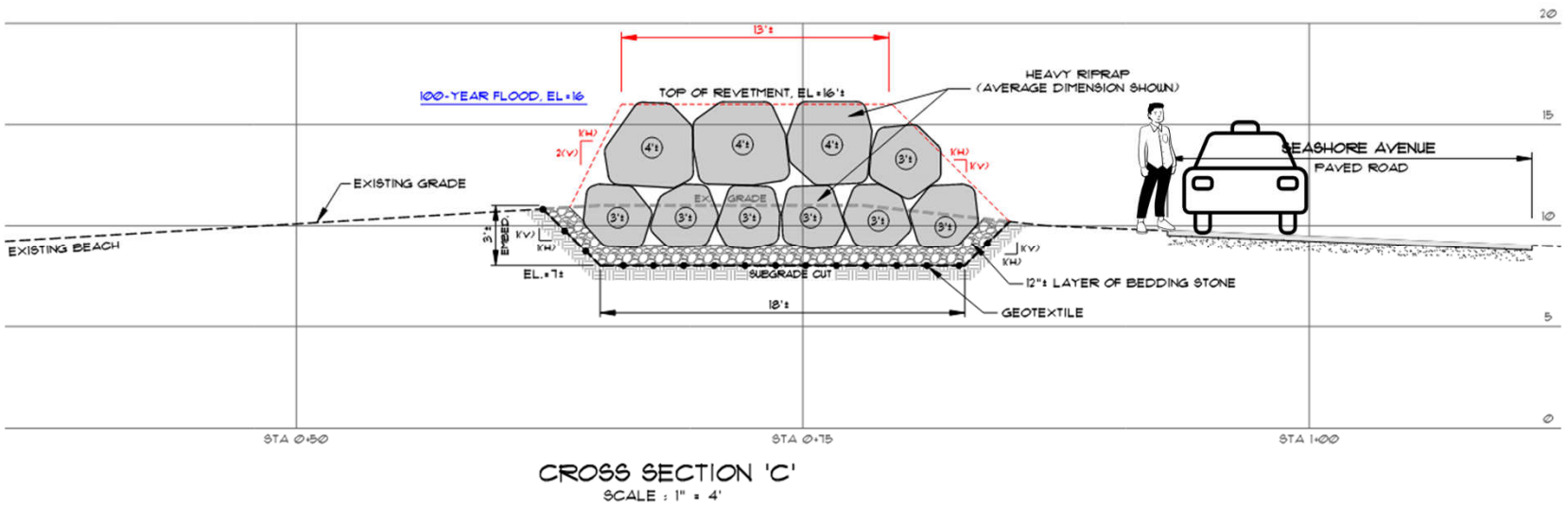




- Install adequately sized riprap revetment to base flood elevation
- Repair damaged roadway
- Improve drainage

26

Seashore Avenue Area 2 – Proposed



CROSS SECTION 'C'
SCALE : 1" = 4'

Represents approximately 6-foot tall person

Represents approximately 5-foot tall vehicle

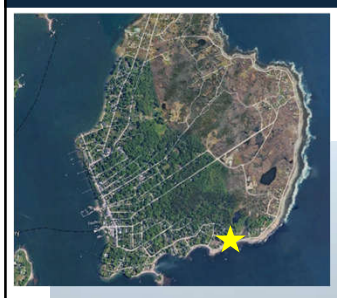
27

Seashore Avenue Area 2 – Existing



28

Seashore Avenue Area 2 – Existing

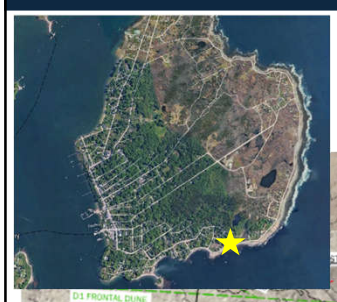


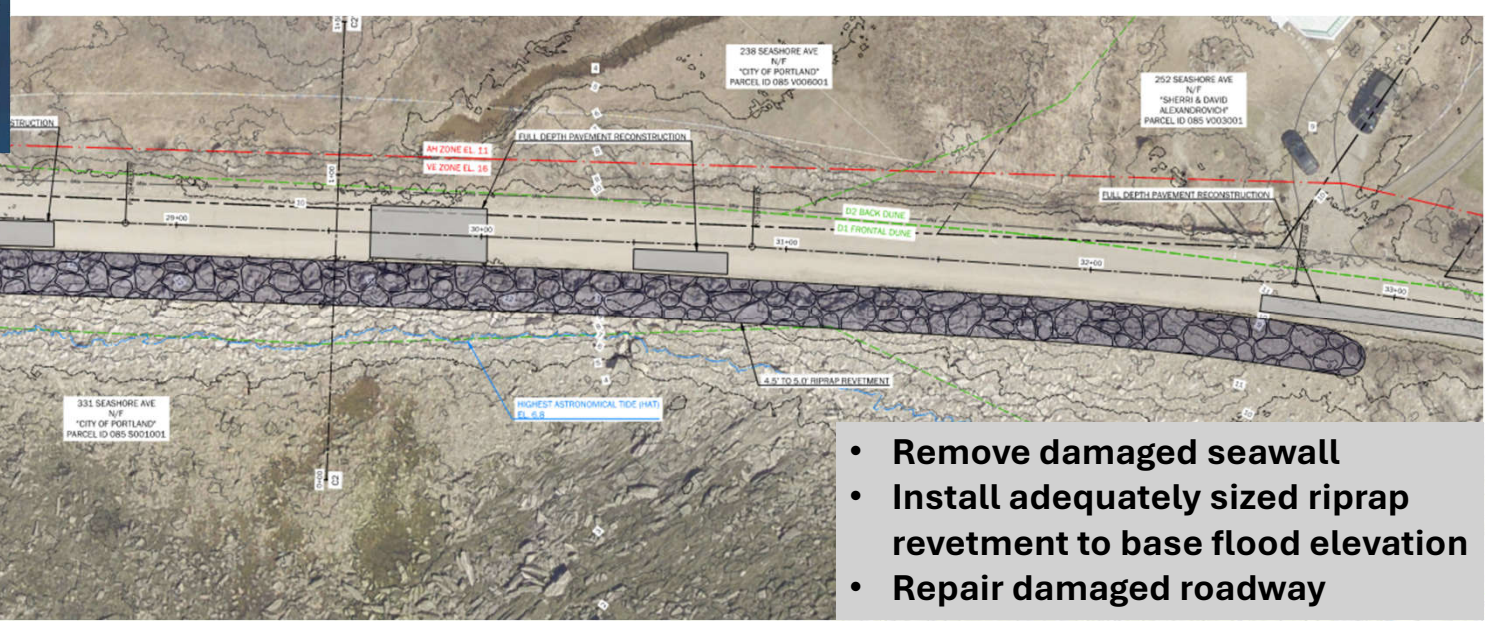




29

Seashore Avenue Area 2 – Proposed

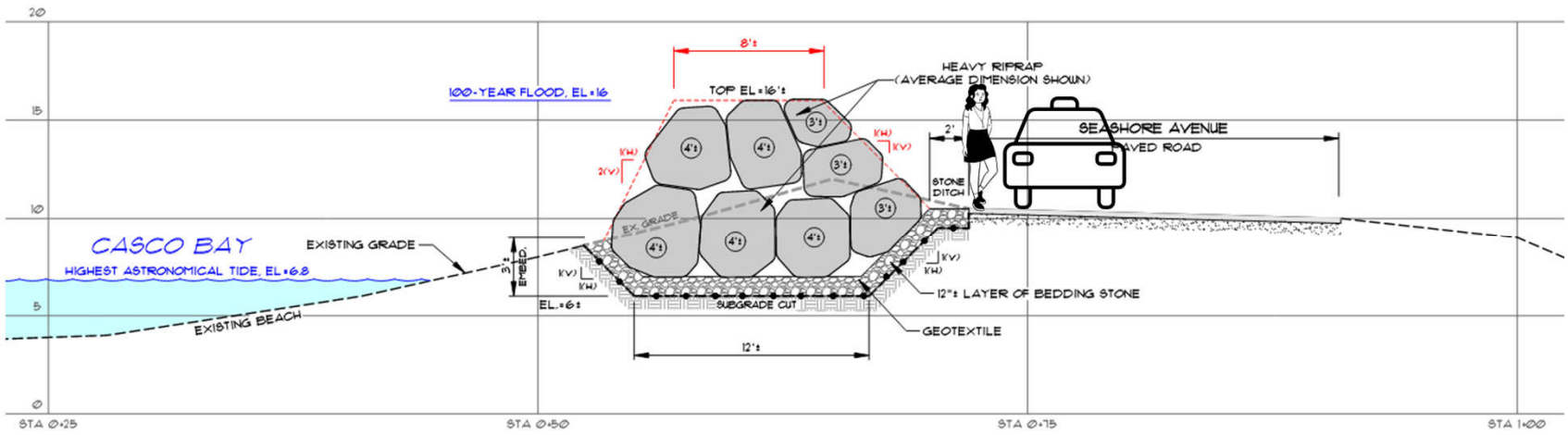




- **Remove damaged seawall**
- **Install adequately sized riprap revetment to base flood elevation**
- **Repair damaged roadway**

30

Seashore Avenue Area 2 – Proposed



CROSS SECTION 'C2'
SCALE : 1" = 4'



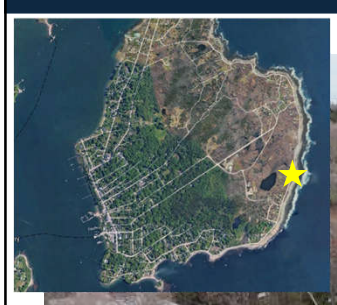
Represents approximately 6-foot tall person



Represents approximately 5-foot tall vehicle

31

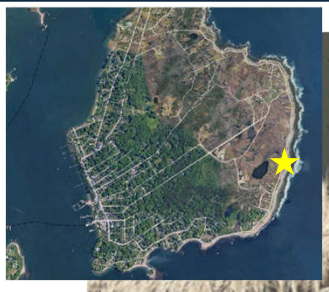
Seashore Avenue Area 3 – Existing



- Erosion
- Displaced stones
- Damaged roadway

32

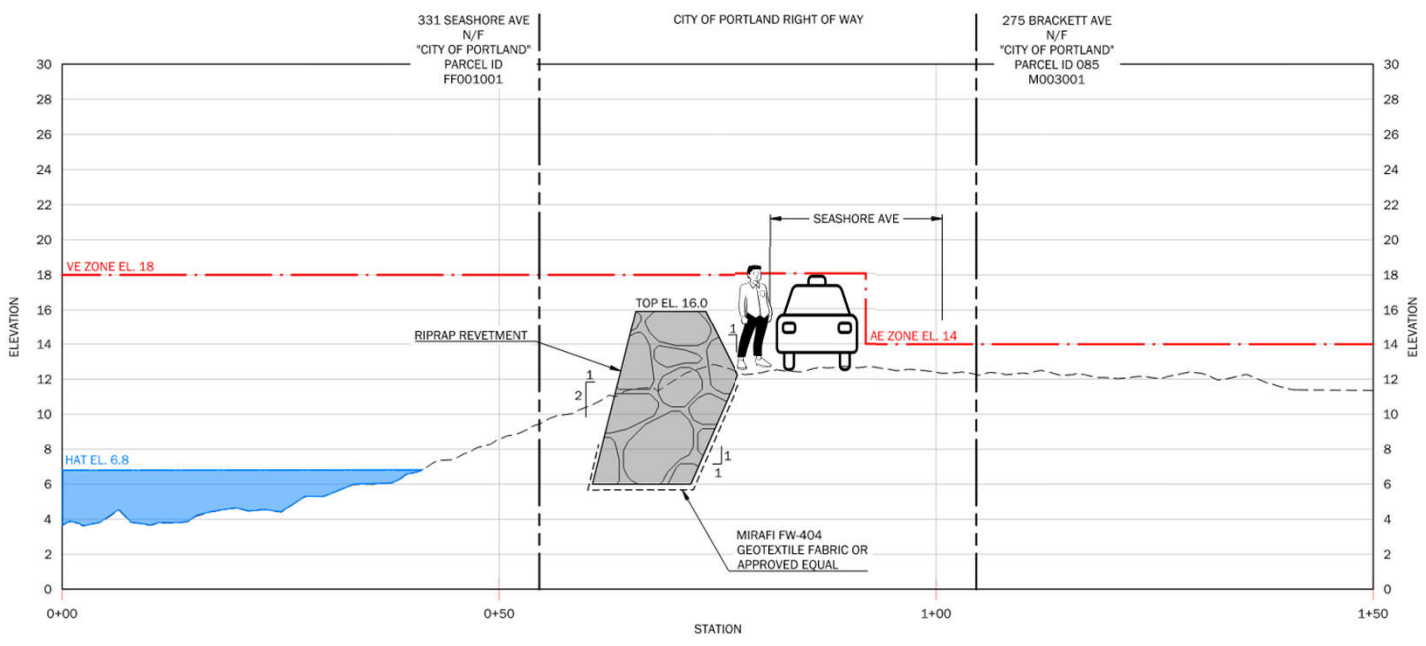
Seashore Avenue Area 3 – Proposed



- **Install adequately sized riprap revetment to 2 feet below base flood elevation**
- **Repair damaged roadway**

33

Seashore Avenue Area 3 – Proposed





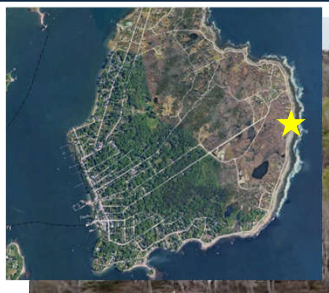
Represents approximately 6-foot tall person



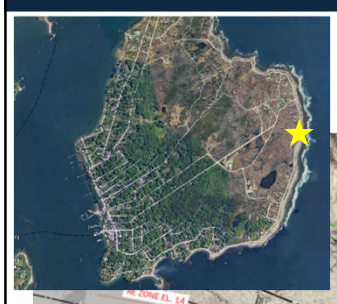
Represents approximately 5-foot tall vehicle

34

Seashore Avenue Area 3 – Existing

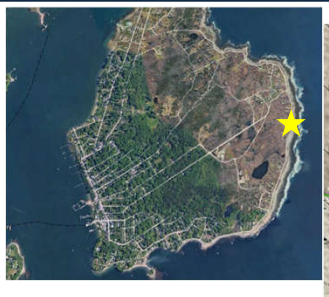


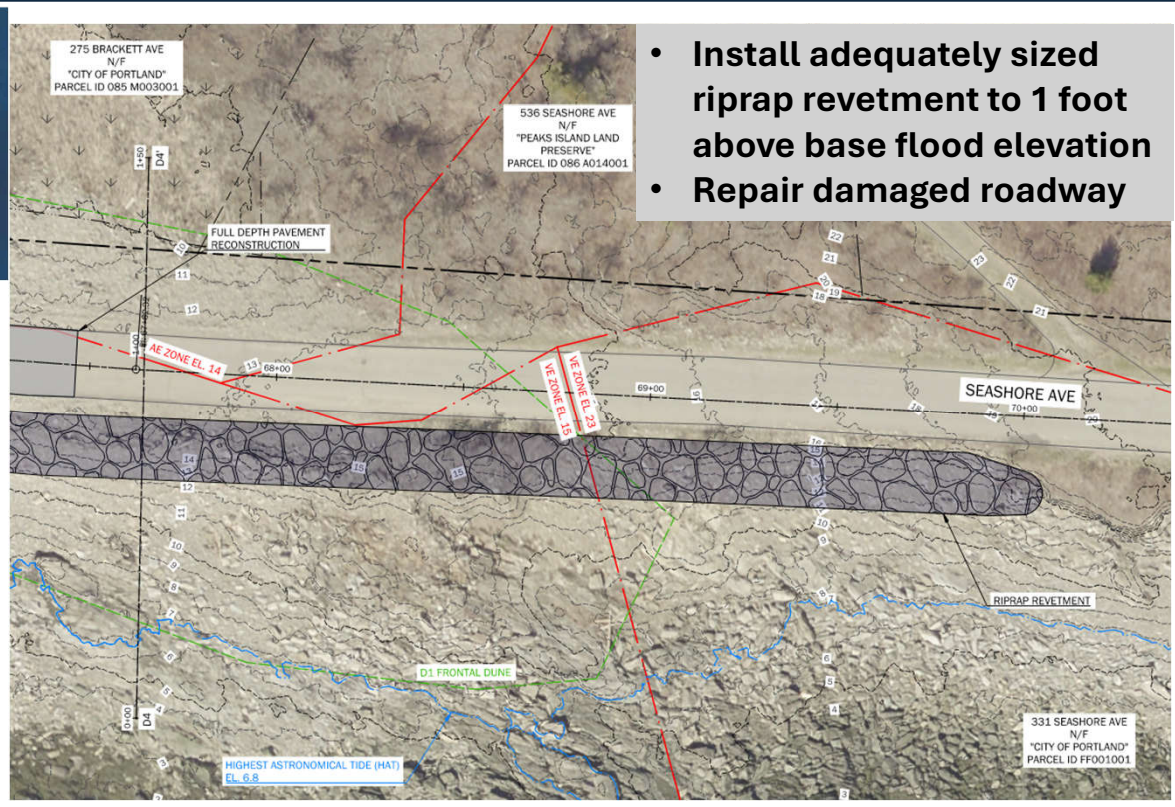
Seashore Avenue Area 3 – Proposed



- **Install adequately sized riprap revetment to base flood elevation or BFE plus 1 foot**
- **Repair damaged roadway**

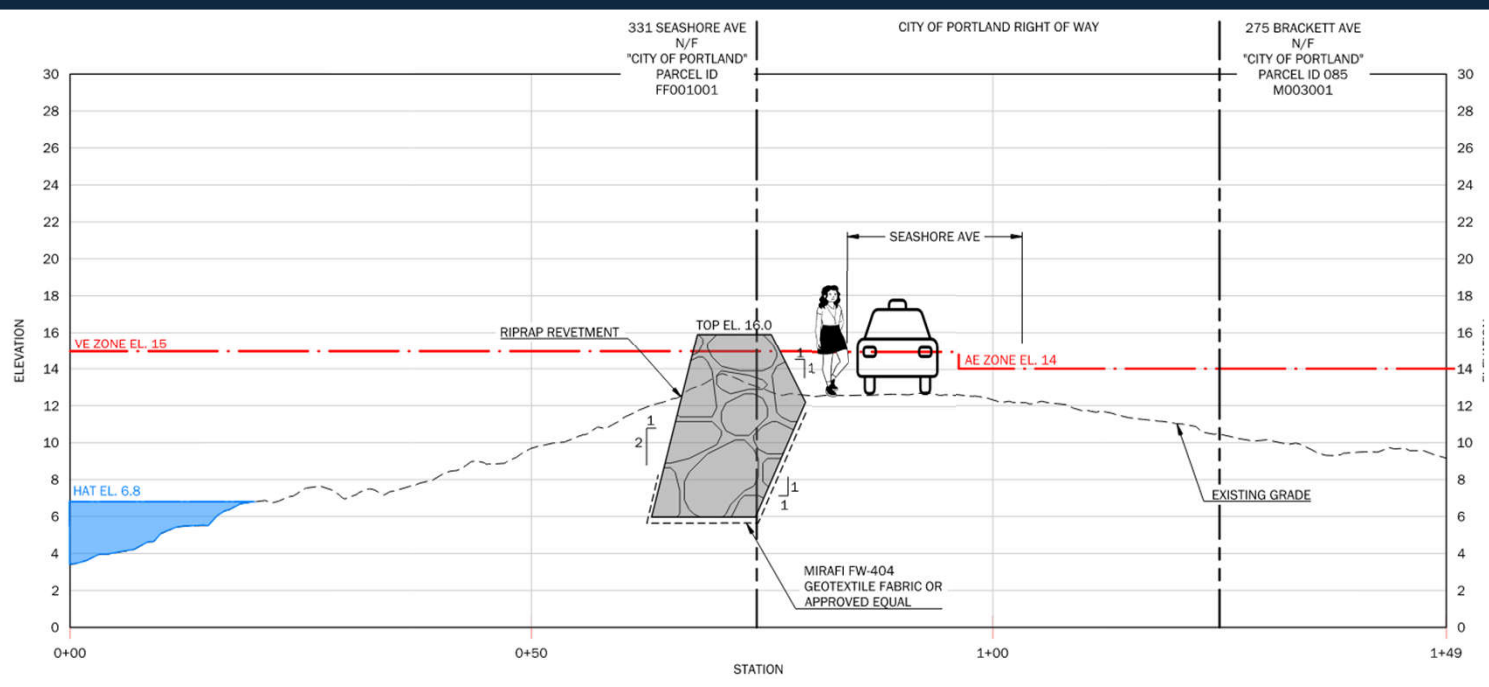
Seashore Avenue Area 3 – Proposed





- **Install adequately sized riprap revetment to 1 foot above base flood elevation**
- **Repair damaged roadway**

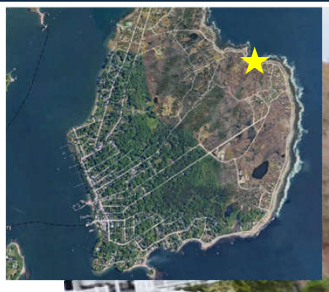
Seashore Avenue Area 3 – Proposed



Represents approximately 6-foot tall person

Represents approximately 5-foot tall vehicle

Seashore Avenue Area 4 – Existing



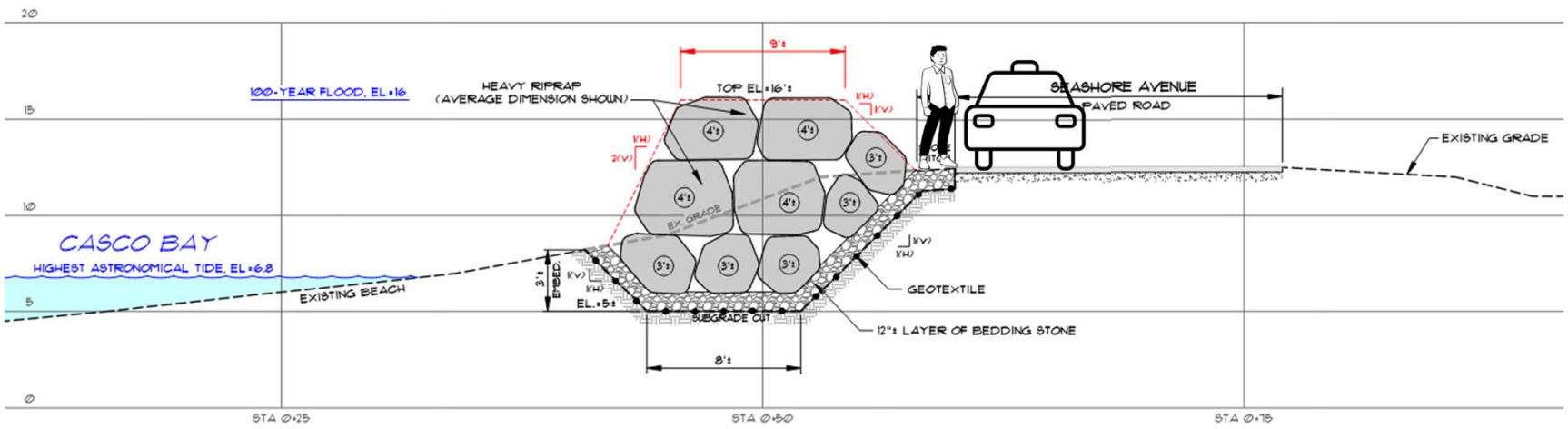
39

Seashore Avenue Area 4 – Proposed



40

Seashore Avenue Area 4 – Proposed



CROSS SECTION 'E'
SCALE : 1" = 4'

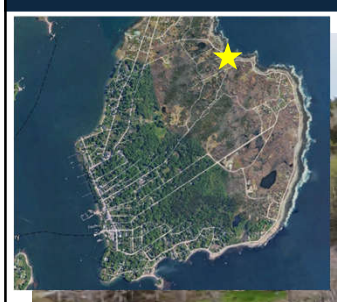


Represents approximately 6-foot tall person



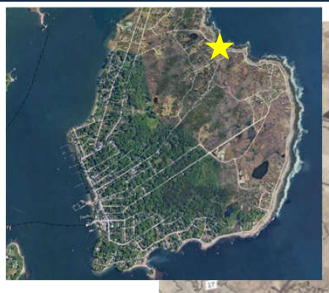
Represents approximately 5-foot tall vehicle

Seashore Avenue Area 5 – Existing



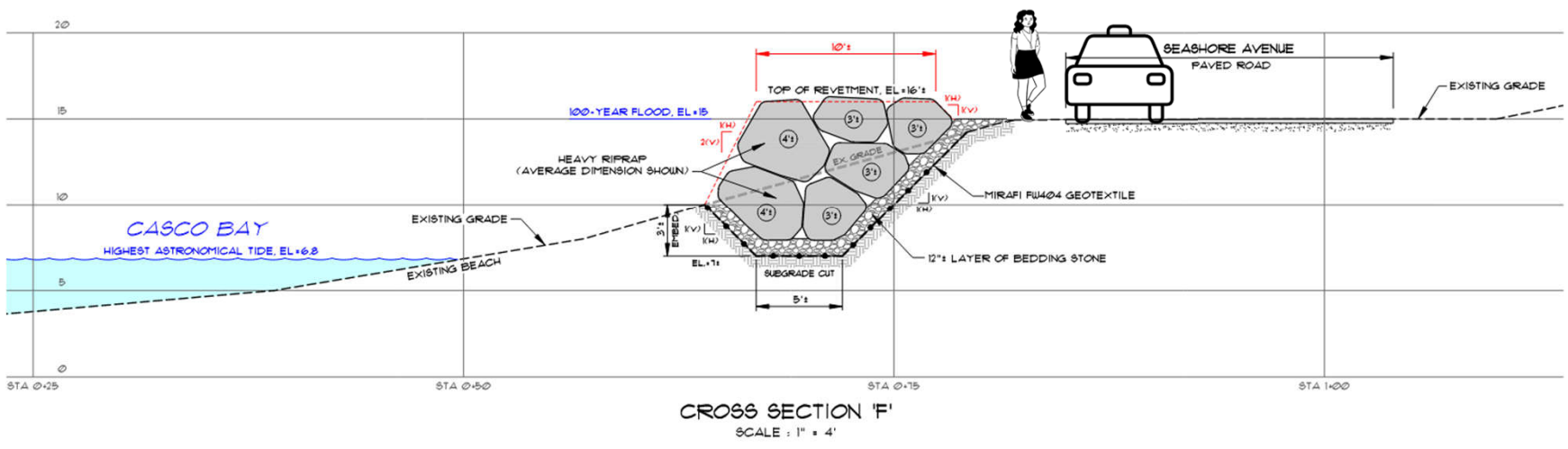
- Erosion
- Displaced stones
- Damaged roadway
- Drainage issues

Seashore Avenue Area 5 – Proposed



- **Install adequately sized riprap revetment to 1 foot above base flood elevation**
- **Repair damaged roadway**
- **Improve drainage**

Seashore Avenue Area 5 – Proposed



CROSS SECTION 'F'
SCALE : 1" = 4'

Represents approximately 6-foot tall person

Represents approximately 5-foot tall vehicle



45

Long Point Road Damages

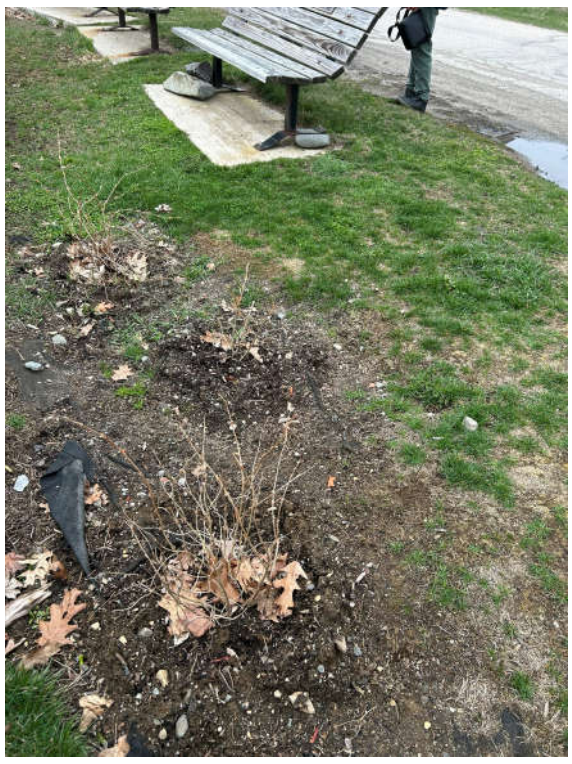




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Seashore Avenue Area 1 Damages





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Seashore Avenue Area 2 Damages





48

Seashore Avenue Area 3 Damages





49

Seashore Avenue Area 4 Damages





50

Seashore Avenue Area 5 Damages



